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IDENTIFYING INFLUENCES OF DRIVING BEHAVIOUR: COULD THE AUSTRALIAN WORK DRIVING SETTING BE UNIQUE?

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Summary: Work-related driving safety is an emerging concern for Australian and overseas organisations. An in depth investigation was undertaken into a group of fleet drivers' attitudes regarding what personal and environment factors have the greatest impact upon driving behaviours. A number of new and unique factors not previously identified were found including: vehicle features, vehicle ownership, road conditions, weather, etc. The major findings of the study are discussed in regards to practical solutions to improve fleet safety.

INTRODUCTION

Work related road safety is an area that previous research has consistently identified as impacting heavily on both the general community and business sectors (Davey & Banks, 2005), as a high proportion of work-related deaths and injuries are associated with road incidents**.** Therefore, there is a need to allocate resources, improve current knowledge and develop interventions that reduce work-related road safety risks. However, relatively little research has examined the self-reported driving behaviours of those who drive company sponsored vehicles and/or spend long periods of time behind the wheel (Newnam et al., 2002; Sullman et al., 2002). Nevertheless, a small body of research suggests that company car drivers are at a greater risk of crash involvement than general motorists due to their exposure to the road and associated work-pressures (Newnam et al., 2002; Sullman et al., 2002). Preliminary research has also indicated that self-reported data provided by fleet drivers can be utilised to predict crash involvement (e.g., Davey et al., 2006) and demerit point loss i.e., committing a higher number of errors (Davey et al., 2006; Davey et al., in 2007). However, apart from these initial findings, very little research has endeavoured to examine fleet drivers' self-reported road safety attitudes and driving behaviours, or the link such factors have with incurring infringement notices. What remains evident is that considering the tremendous amount of kilometres driven by professional drivers within Australia each year there is a genuine need to identify and address factors predictive of road crashes.

This research, along with many road safety initiatives are often driven by models of driving behaviour. While previous research has proposed a variety of factors that may influence driving behaviour (Sullman et al. 2002; Freeman et al., 2007), one of the most widely cited models is that of Lonero and Clinton (1998). This model indicates influences that determine drivers' current behaviour. The researchers argue that both ability and motivation are important to driving behaviour, and suggest that an individual's driving behaviour can be influenced by a variety of dynamic factors that do not necessarily remain static. For instance, although a variety of influences may be present they may be situational specific and likely to invoke differing levels of influence depending on an individual's current driving circumstance. Furthermore, Lonero

and Clinton suggest that the strengths of these influences may differ simply due to the proximity or immediacy of the influences. This model is also widely applicable within many transport authorities' crash investigations and corresponding databases, as similar to the model, a broad range of contributing factors to crashes have been identified, including driver and road conditions. For example, Queensland Transport (2001) lists factors contributing to crashes such as; disobeying Road Rules, alcohol/Drugs, speed, inexperience, etc. Many of these factors contributing to crashes fit within the broader context and framework provided by Lonero and Clinton (1998).

Questions remain as to the predominant factors that influence driving performance in fleet settings, and whether differences exist between general motorists and professional drivers. A recent Australian study has indicated that individuals driving for work within an Australian fleet setting may experience many other and somewhat unique factors that also influence driving behaviour (Freeman et al., 2007; Davey et al., 2007). These studies reported that participants were more likely to speed while driving for work, although drivers who perceived speeding as serious were less likely to actually engage in this behaviour within the previous six months. Participants that drove further distances were less likely to report positive attitudes toward road safety and a higher level of perceived work pressure was more likely to result in higher frequency of crashes. Furthermore, the results also suggested that drivers were more at risk due to tiredness, fatigue and loss of concentration and distractions and importantly fatigue and driving while tired predicted demerit point loss over and above exposure factors.

Nevertheless, one similarity with the general driving population is that a range of factors have also been proposed to influence crash involvement within fleet settings. For example, anecdotal evidence throughout company-funded investigations of a number of large diverse vehicle fleets within Queensland has revealed that the most common types of crashes accounting for the vast majority of fleet incidents are represented by: (a) reversing (b) "rear-enders" and (c) damage while parking. Additionally, such crashes are most often attributed to road conditions, loss of control and animal related incidents (Wishart et al., 2004). Interestingly, these crash categories appear to be a reflection of a combination of a blameworthy and asset management approach to crashes and fail to provide any insight into the perceptions, attitudes, safety climate and organisational culture contributing to crashes through the influence on human behaviour. As a result the current research project aimed to conduct an exploratory investigation into a group of fleet drivers' attitudes regarding what personal and environment factors have the greatest impact upon their driving behaviours. Specifically, the research aimed to: (a) What are the major influences to fleet driver's behaviour when at work? and (b) are such factors identified within predominant driving behaviour models (e.g. Lonero & Clinton, 1998)?

METHOD

Participants and Procedure

The focus groups were conducted as a component of a series of workshops undertaken with participants working within environmental and construction departments within a large organisation operating a vehicle fleet. The participants were all people that voluntarily attended the focus group sessions and indicated that they drive operational vehicles as a component of

their work. A total of 217 participants (160 males, 57 females) were included in focus groups. The average age of participants in the sample was 41 years with an average of 23 years driving experience. The work roles within the sample comprised 91 field workers, 76 office workers and 50 workers indicating that they worked in both field and office roles. The most common types of vehicle driven for work were 115 participants drive sedans, utilities or station wagons, 95 drive 4 wheel drives, and 7 drive trucks. One hundred and forty two participants indicated they drive less than 20 000 kms per year and 70 drive between 20 000 and 50 000 kms for work annually. Five participants reported driving in excess of 50 000 kms per year for work. Participants were asked "What are some of the influences to your own driving behaviour when driving for work?" Additional probing questions were employed to clarify and or expand on the meaning or issues highlighted by participants during the focus groups. For example if participants indicated that work pressure influenced their driving behaviour when driving for work they were asked "Can you further explain what you mean by that?" Responses from participants were recorded by another researcher present in the room and were written down verbatim.

Analysis of Data

An inductive "open" coding technique developed by Strauss (1987) was implemented that entails re-reading the text, focusing on and coding the attitudes and perceptions that emerge from the text (e.g., themes), and developing and revising such codes. A coding book was developed and the reliability of the coded schemes was addressed by having the transcripts independently coded by a second researcher. Participants' relatively brief responses to questions complemented this approach, and making verbal recording of responses was not undertaken to ensure anonymity and confidentiality. Furthermore, it was felt that if participants were assured of not being identifiable outside the confines of the workshop group then they make speak more freely regarding their work related driving behaviour and potential influences to those behaviours.

RESULTS AND DISCUSSION

The first series of questions focused on identifying the major influences to fleet driver's behaviour when at work. As depicted in Table 1, the major themes (and thus influences) that were identified included:

Table 1. Major Influences to Fleet Driver's Behaviour

Fatigue	Speed limits	Impatience
Knowledge of risk	Experience	Anger
Frustration	Other drivers	Health
Mood	Passengers	Culture (Movies, music)

Not surprisingly, many of the factors of influence identified by the participants are the cornerstones of current road safety campaigns for example fatigue, health, alcohol drugs, and speed. It is noteworthy that such factors have also been accounted for in as conditions influencing driver behaviour as conceptualised by Lonero & Clinton (1998).

However, it is noteworthy that a number of new themes emerged that related to a range of vehicle and environment related factors. In regards to the former, six new themes were identified which encompassed: (a) make of vehicle, (b) vehicle load, (c) vehicle features

(positive & negative), (d) vehicle ownership and (e) vehicle limitations (see Table 2). Firstly, the make and model of the vehicle may prove to have a large effect on the driving outcomes of fleet drivers. For instance, drivers commented on differences between 4 wheel drive vehicles and sedans and indicated that a 4 wheel drive will get them to locations in terrain that would be impossible to travel in a sedan. Secondly, drivers commented on the manner in which different types of loads being transported by their vehicles can influence the type of driving that they undertake. For example, a number of drivers discussed the differences between carrying loads comprising liquid versus a solid load, whereby a liquid load is continuously moving as a result of the constant motion of the vehicle combined with the structure of the road. Drivers commented that if carrying a liquid load then their driving requires more attention with constant changes to the vehicle operation as a result of the shifting of load and weight distribution. Vehicle features were identified by drivers as a further influence of their driving with comments reflecting that various vehicle features could have either a positive or negative influence on driving. For instance, modern vehicles having cruise control can have a positive influence by preventing speeding although conversely modern vehicle are also capable of travelling at much higher speeds than posted speed limits and are also extremely well designed for comfort. Subsequently, drivers commented that due to modern vehicle design you are not aware that you are driving faster than the speed limit as it doesn't feel that fast and there is reduced noise.

Participants also acknowledged that driving a company supplied vehicle was different to driving your own vehicle and that employees did not care as much about the company vehicle in comparison to their own. The participants suggested that this may subsequently influence the way in which people drive or even care for a company car. The final sub theme identified as vehicle related referred to possible limitations of specific vehicles with comments indicating that although certain vehicles may be perceived as similar, there are often differences in handling abilities which need to be accommodated by drivers across various conditions and requirements of use.

Environmental conditions incorporated themes such as (a) weather, (b) road conditions, and (c) distance required for travel (see Table 2). Participants referring to weather conditions discussed the implications of extreme weather conditions often experienced within various regions. For instance, extreme wet experienced in remote areas of Australia may require drivers to not only travel slower but also take alternate routes. In contrast, extremely harsh temperature conditions are experienced within summer months and can be even more extreme in remote areas.

The road conditions appear to influence drivers in two distinct ways. Firstly, the poor condition of the road can influence drivers to take extra precautions. Alternatively, roads that have been upgraded or are in remote locations can be straight for extended periods of time, resulting in drivers experiencing boredom and possibly fatigue. Furthermore, to combat boredom drivers admitted to driving faster if the road was also straight with a view to arriving at their destination in a shorter time indicating that they just wanted to get the trip over and done with. Finally, extended travel distances was cited as encouraging drivers to speed, although drivers also suggested that extended distances force them to take more precautions as in remote locations there is little opportunity to assistance should something go wrong. Drivers also commented that extended travelling distances influences them to share the driving.

Table 2. Participant Responses in Relation to Vehicle Related Factors and Environmental Conditions

Theme - Vehicle	Example	Theme - Environmental	Example
Vehicle related	These issues all relate to the manner in which factors associated with the vehicle can influence driver behaviour while driving for work.	***Environmental conditions***	Environmental conditions is a theme that incorporates issues influencing driver behaviour that relate to the type of driving environment work related drivers operate their vehicle in.
Make model of vehicle	"The make and model of vehicle has an influence on how we drive. For example how I drive a 4wheel drive Landcruiser is not the same as how I drive a commodore. I know the Landcruiser can get me to places that you wouldn't even think about going in a commodore."	*Weather*	If we've had really bad weather up here then I certainly drive much slower, maybe also drive a different way to get there (different route). Depending on the time of the year… like it can get really hot here in summer… well I just want the day to end I want to get back in the cool.
Vehicle load	"I drive differently depending on the type of load I am carrying, say I have a load that is liquid well I'm going to drive differently than if the load was something solid and couldn't move. Liquid can move within the container and all of a sudden you have got all the weight of your load on one side of the vehicle."	*Road conditions*	Some of the roads are pretty ordinary, we don't just drive on bitumen some of the dirt roads are pretty tricky and you might have to slow down a fair bit. The straight roads make it pretty boring and I just want to get there so the roads are pretty good with not a lot of other vehicles so I probably drive faster
Vehicle features (positive influence)	"Vehicle features can change the way you drive. If a vehicle has cruise control then maybe it helps me not to speed as I can just set the cruise control."	*Distance required for travel*	"I certainly take more precautions if I am driving longer distance." "We travel such long distances and it gets really boring especially on the straight roads out here, so you tend to go a bit faster just 'cause you want to get there." "If we have a lot of driving to do we tend to take turns driving"
Vehicle features (negative influence)	"Some of today's vehicles are so well built and powerful that you can drive over the speed limit and you don't even know you are doin' it." "Engineering designs of today's cars make them more comfortable, like you can't even hear any noise. They're also capable of going at speeds much faster than the speed limit."		
Own vehicle versus company vehicle	People probably drive company cars a bit different to their own car.		
Vehicle limitations	"Some of the vehicles we have to use are no good for things like towing. They lack power so I have to take this into consideration when I am driving with a load up the range (mountain)." "Some vehicles just don't handle as well as others so you have to account for this in your driving."		

It is also suggested that some of the themes previously identified in Lonero and Clinton (1998) could be expanded to incorporate a number of sub themes established within the current focus group research. The sub themes identified included; *Personal life issues*, *Issues at work, Response to emergency situation*, *Knowledge of the route and Familiarity and unfamiliarity of the area or route, Over and under confidence*, *Potential consequences of unsafe driving.*

Participant comments also provided specific indicators as to the manner in which many of these sub themes could influence work related driving behaviour. It should also be acknowledged that many of these themes could have either a positive or a negative influence. For example a participant's lack of knowledge of the area or route in some instances may contribute or influence a driver to drive a vehicle more carefully. For instance, a driver driving in an area that is unfamiliar may drive slowly due to a lack of knowledge and perception of potential difficulties in road surface or potential hazards around the next bend. Alternatively, this same lack of knowledge or unfamiliarity may contribute to adverse driving behaviour due to the driver not possessing or being aware of the specific dangers associated with this particular environment.

Participants highlighted the issue of responding to an emergency situation. Although this could indicate an influence on driving behaviour that relates to time pressure, comments from participants also reflected the impact on their driving behaviour that related to the adrenalin rush that they experienced when responding to an emergency incident. Participants discussed the manner in which the adrenalin can influence the way they drive and highlighted that if they do not keep the adrenalin levels in check then they are more likely to take more risks and focus attention solely on arriving at the destination as quickly as possible.

Over or under confidence of the driver was also identified as a factor contributing to driver behaviour. Examples from participants suggested that an over confidence in one's ability could influence the vehicle operators to take increased risks. Alternatively, drivers experiencing a lack of confidence indicated that they were more likely to make errors of judgement and also be more likely to be influenced by other drivers.

Finally, participants commented that if they thought the consequences associated with driving unsafe were severe enough then they may be likely to take extra precautions. For example, some participants indicated that a serious crash would compromise their lifestyle and impact on young family thus influencing them to drive safer.

CONCLUSION

The purpose of this research was to investigate the factors that influence work related drivers in Australian fleet settings. Not surprisingly, many of the factors influencing driver behaviour that were identified by participants are the focus of standard road safety campaigns and have been conceptualised and identified in previous research. However, a number of new and unique factors influencing driver behaviour have been identified within this research. Primarily, these influences issues associated with vehicles and the particular road environment experienced within Australia. Interestingly, vehicle related issues could have either a positive and negative effect on driver behaviour. The results of this research suggest that some vehicle features and technological improvements while designed to increase driving comfort safety and performance

may actually have some adverse effects on driver behaviour. It is suggested that these vehicle influences may have implications for fleet procurement personnel to develop comprehensive vehicle fit for purpose criteria.

The results also indicated specific issues associated with the environment which may be in contrast to environmental conditions experienced within other countries. For example, due to the vast distances travelled within Australia many roads are designed to continue for long straight sections which although reducing hazards associated with bends in the road may contribute to further issues associated with fatigue.

In conclusion this research has revealed a number of factors influencing work related driving behaviour that may be specific to Australian fleet settings. It is suggested that future research further explore these issues to determine the level of impact that these factors have on drivers operating vehicles across various sectors of the Australian workforce.

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